

Please type a plus sign (+) inside this box →

PTO/SB/21 (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paper Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

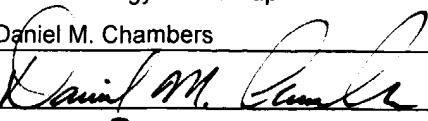
| | | | |
|--|--|------------------------|------------------|
| TRANSMITTAL FORM | | Application Number | 10/072,975 |
| | | Filing Date | Feb 9, 2002 |
| | | First Named Inventor | Efimov, Vladimir |
| | | Group Art Unit | 1637 |
| | | Examiner Name | Riley, Jezia |
| Total Number of Pages in This Submission | | Attorney Docket Number | ACT-1102-CIP1 |

RECEIVED
APR 5 2004
TECH CENTER 1800/2900

ENCLOSURES (check all that apply)

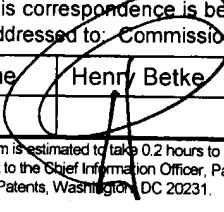
| | | |
|--|--|--|
| <input type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached | <input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input checked="" type="checkbox"/> CD, Number of CD(s) <u>One CD containing 105 references and publications</u> | <input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): 1. Form 1449 (8 pages) 2. Form 1449 (2 pages) 3. Form 1449 (1 page) 4. Form 1449 considered 10/7/03 (8 pages) 5. Form 1449 considered 10/7/03 (2 pages) 6. Form 1449 considered 10/7/03 (1 page) 7. Return Postcard |
| <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) | <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request | <input type="checkbox"/> Remarks |
| <input checked="" type="checkbox"/> Information Disclosure Statement (in duplicate) | <input type="checkbox"/> Certified Copy of Priority Document(s) | |
| <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53 | | |

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | |
|-------------------------|---|--|
| Firm or Individual name | BioTechnology Law Group Daniel M. Chambers | |
| Signature |  | |
| Date | March 30, 2004 | |

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on this date:

| | | | |
|----------------------|---|------|----------------|
| Type or printed name | Henry Betke | Date | March 31, 2004 |
| Signature |  | | |

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | |
|--|------------------------|
| Applicant(s): Efimov, et al. | |
| Serial No.: 10/072,975 | Group Art Unit: 1637 |
| Filed: 2/9/2002 | Examiner: Riley, Jezia |
| Title: Oligonucleotide Analogs, Methods of Synthesis and Methods of Use | |
| Attorney Docket No.: ACT-1102-CIP1 | |

MAIL STOP: TC 1600
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Dear Sir:

The attached Information Disclosure Statements are re-submitted with a CD containing missing references at the request of the Examiner in the October 9, 2003 Non-Final Office Action.

For Examiner's further consideration, we have enclosed a CD containing all missing references in PDF format. Courtesy copies of the partially considered Forms 1449 are also enclosed.

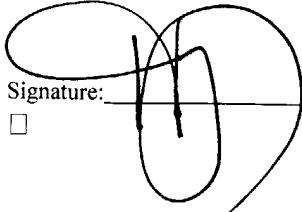
No additional fees are believed to be due for this submission; however, if fees are due, the Commissioner is authorized to charge any other required fees associated with this filing submitted herewith to **Deposit Account No. 502728** and please reference attorney docket no.: **ACT-1102-CIP1**. A duplicate copy of this document is enclosed.

It is requested that the information disclosed herein be made of record in this application.

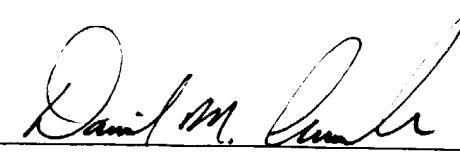
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: MAIL STOP: TC 1600, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Date of Deposit: March 31, 2004

Typed Name: Henry Betke


Signature: HB

Respectfully submitted,


Daniel M. Chambers

Daniel M. Chambers
Attorney/Agent for Applicant(s)
Reg. No. 34561

Date: March 30, 2004

Telephone No.: 858-350-9690

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | |
|--|------------------------|
| Applicant(s): Efimov, et al. | |
| Serial No.: 10/072,975 | Group Art Unit: 1637 |
| Filed: 2/9/2002 | Examiner: Riley, Jezia |
| Title: Oligonucleotide Analogs, Methods of Synthesis and Methods of Use | |
| <u>Attorney Docket No.: ACT-1102-CIP1</u> | |

MAIL STOP: TC 1600
Commissioner for Patents
P.O. Box 1450
Alexandria, VA22313-1450

INFORMATION DISCLOSURE STATEMENT

Dear Sir:

The attached Information Disclosure Statements are re-submitted with a CD containing missing references at the request of the Examiner in the October 9, 2003 Non-Final Office Action.

For Examiner's further consideration, we have enclosed a CD containing all missing references in PDF format. Courtesy copies of the partially considered Forms 1449 are also enclosed.

The relevance of the attached references is that this is the closest art of which Applicant is aware. Applicant submits that the above references taken alone or in combination neither anticipate nor render obvious the present invention. Consideration of the foregoing in relation to this application is respectfully requested.

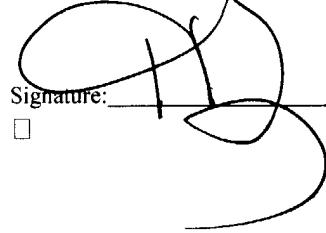
No additional fees are believed to be due for this submission. The Commissioner is authorized to charge any other required fees associated with this filing submitted herewith to **Deposit Account No. 502728** and please reference attorney docket no.: **ACT-1102-CIP1**. A duplicate copy of this document is enclosed.

It is requested that the information disclosed herein be made of record in this application.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: MAIL STOP: TC 1600, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

Date of Deposit: March 31, 2004

Typed Name: Henry Betke


Signature: Henry Betke

Respectfully submitted,



Daniel M. Chambers
Attorney/Agent for Applicant(s)
Reg. No. 34561

Date: March 30, 2004

Telephone No.: 858-350-9690

**INFORMATION DISCLOSURE
STATEMENT
BY APPLICANT**

(Use several sheets if necessary)

Docket Number:
AM-00102.P.1.1-US

Patent Number:
10/072,975

Applicant:
Efimov et al.

Filing Date:
February 9, 2002

Group Art Unit:
1651

U.S. PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB-CLASS | FILING DATE IF APPROPRIATE |
|------------------|-----|-----------------|----------|------------------------------|-------|-----------|----------------------------|
| | P1 | 5,432,272 | 7/11/95 | Brenner | | | |
| | P2 | 5,508,178 | 4/16/96 | Rose <i>et al.</i> | | | |
| | P3 | 5,539,082 | 7/23/96 | Nielsen <i>et al.</i> | | | |
| | P4 | 5,641,625 | 6/24/97 | Ecker <i>et al.</i> | | | |
| | P5 | 5,656,461 | 8/12/97 | Demers | | | |
| | P6 | 5,714,331 | 2/3/98 | Buchardt <i>et al.</i> | | | |
| | P7 | 5,719,262 | 2/17/98 | Buchardt <i>et al.</i> | | | |
| | P8 | 5,736,336 | 4/7/98 | Buchardt <i>et al.</i> | | | |
| | P9 | 5,766,855 | 6/16/98 | Buchardt <i>et al.</i> | | | |
| | P10 | 5,773,571 | 6/30/98 | Nielson <i>et al.</i> | | | |
| | P11 | 5,786,461 | 7/28/98 | Buchardt <i>et al.</i> | | | |
| | P12 | 5,837,459 | 11/17/98 | Berg <i>et al.</i> | | | |
| | P13 | 5,861,250 | 1/19/99 | Stanley <i>et al.</i> | | | |
| | P14 | 5,864,010 | 1/26/99 | Cook <i>et al.</i> | | | |
| | P15 | 5,874,553 | 2/23/99 | Peyman <i>et al.</i> | | | |
| | P16 | 5,888,733 | 3/30/99 | Hyldig-Nielson <i>et al.</i> | | | |
| | P17 | 5,932,711 | 8/3/99 | Boles <i>et al.</i> | | | |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

U.S. PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMEN T NUMBER | DATE | NAME | C L A SS | SUB- CLASS | FILING DATE IF APPROPRIATE |
|---------------------|-----|---------------------|----------|---------------------------------|-------------------|---------------|-------------------------------|
| | P18 | 5,972,610 | 10/26/99 | Buchardt <i>et al.</i> | | | |
| | P19 | 5,977,296 | 11/2/99 | Nielson <i>et al.</i> | | | |
| | P20 | 6,004,750 | 12/21/99 | Frank-Kamenetskii <i>et al.</i> | | | |
| | P21 | 6,015,887 | 1/18/00 | Teng | | | |
| | P22 | 6,020,124 | 2/1/00 | Sorenson | | | |
| | P23 | 6,020,126 | 2/1/00 | Carlsson <i>et al.</i> | | | |
| | P24 | 6,025,140 | 2/15/00 | Langel <i>et al.</i> | | | |
| | P25 | 6,025,482 | 2/15/00 | Cook <i>et al.</i> | | | |
| | P26 | 6,045,995 | 4/4/00 | Cummins <i>et al.</i> | | | |
| | P27 | 6,060,242 | 5/9/00 | Nielson <i>et al.</i> | | | |
| | P28 | 6,063,571 | 5/16/00 | Uhlmann <i>et al.</i> | | | |
| | P29 | 6,107,470 | 8/22/00 | Nielson <i>et al.</i> | | | |
| | P30 | 6,110,676 | 8/26/00 | Coull <i>et al.</i> | | | |
| | P31 | 6,110,678 | 8/29/00 | Weisburg <i>et al.</i> | | | |
| | P32 | 6,150,510 | 11/21/00 | Seela <i>et al.</i> | | | |
| | P33 | 6,165,720 | 12/26/00 | Felgner <i>et al.</i> | | | |
| | P34 | 6,180,770 | 1/30/01 | Boles <i>et al.</i> | | | |

| | | | |
|-----------------------|--|--------------------|--|
| Examiner Signature | | Date Considered | |
|-----------------------|--|--------------------|--|

| FOREIGN PATENT DOCUMENTS | | | | | | | | |
|--------------------------|-----|--------------------|----------|---------|-------|---------------|-------------|----|
| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB- CLASS | Translation | |
| | | | | | | | YES | NO |
| | F1 | WO 92/002258 | 2/20/92 | | | | | |
| | F2 | WO 92/20702 | 11/26/92 | | | | | |
| | F3 | WO 93/10820 | 6/10/93 | | | | | |
| | F4 | WO 94/22892 | 10/13/94 | | | | | |
| | F5 | WO 94/24144 | 10/27/94 | | | | | |
| | F6 | WO 99/14266 | 3/25/99 | | | | | |
| | F7 | WO 00/56746 | 9/28/00 | | | | | |
| | F8 | WO 00/56748 | 9/28/00 | | | | | |
| | F9 | WO 00/56916 | 9/28/00 | | | | | |
| | F10 | WO 00/56920 | 9/28/00 | | | | | |

| | | | |
|-----------------------|--|--------------------|--|
| Examiner Signature | | Date Considered | |
|-----------------------|--|--------------------|--|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|-------------------|-----|--|
| | D1 | Adams et al., J. Am. Chem. Soc. 105:661-663 (1983) |
| | D2 | Ausubel et al., Current Protocols in Molecular Biology, John Wiley and Sons (1998) |
| | D3 | Beaucage and Caruthers, Tetrahedron Lett. 22:1859-1862 (1981) |
| | D4 | Briegohl et al., Bioorg. & Med. Chem. Lett. 6:665 (1996) |
| | D5 | Buchardt et al., PNAs and their Potential Applications in Biotechnology, Tibtech 11: 384-386 (1993) |
| | D6 | Chandler et al., Affinity Capture and Recovery of DNA at Femtomolar Concentrations with PNA Probes, Analytical Biochemistry 283: 241-249 (2000) |
| | D7 | Chow et al., Nucl. Acids Res 9:2807-2817 (1981) |
| | D8 | Cochet et al., Selective PCR Amplification of Functional Immunoglobulin Light Chain from Hybridoma Containing the Aberrant MOPC 21-Derived V _k by PNA-Mediated PCR Clamping, Biotechniques 26: 818-822 (1999) |
| | D9 | Coste et al., Tetrahedron Lett. 31:669-672 (1990) |
| | D10 | Crea and Horn, Nucl. Acids Res. 8:2331-2348 (1980) |
| | D11 | Domling et al., A Novel Method to Highly Versatile Monomeric PNA Building Blocks by Multi Component Reactions, Bioorganic & Medicinal Chemistry Letters 9: 2871-2874 (1999) |
| | D12 | Efimov et al., Nucl. Acids Res 11:8369-8387 (1983) |
| | D13 | Efimov et al., Nucl. Acids Res. 13:3651-3666 (1985) |
| | D14 | Efimov et al., Application of new catalytic phosphate protecting groups for the highly efficient phosphotriester oligonucleotide synthesis, Nucl. Acids Res. 14:6525-6540 (1986) |
| | D15 | Efinov et al., Abstracts of Protein Engineering Symposium, Groningen, May 4-7, 1986, Groningen, The Netherlands, Drenth, ed. p.9 (1986) |
| | D16 | Efimov et al., Collect. Czech. Chem. Commun. 61:S262-S264 (1996) |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|-------------------|-----|---|
| | D17 | Efimov et al., <i>Bioorg. Khim.</i> 24:696-709(1998) |
| | D18 | Efimov et al., Synthesis and evaluation of some properties of chimeric oligomers containing PNA and phosphono-PNA residues, <i>Nucl. Acids Res.</i> 26:566-575 (1998) |
| | D19 | Efimov et al., Synthesis of polyacrylamides N-substituted with PNA-like oligonucleotide mimics for molecular diagnostic applications, <i>Nucl. Acids Res.</i> 27:4416-4426 (1999) |
| | D20 | Efimov et al., Peptide Nucleic Acids and Their Phosphonate Analogues: II. Synthesis and Physicochemical Properties of Hybrids Containing Serine and 4-Hydroxyproline Residues, <i>Russian Journal of Bioorganic Chemistry</i> 25:545-555 (1999) |
| | D21 | Efimov et al., Polyacrylamide Conjugates with Oligonucleotides and Their Mimics for Diagnostics, <i>Russian Journal of Bioorganic Chemistry</i> 25:752-758 (1999) |
| | D22 | Efimov et al., Phosphonate Analogues of Peptide Nucleic Acids and Related Compounds: Synthesis and Hybridization Properties, <i>Nucleosides & Nucleotides</i> 18:1393-1396 (1999) |
| | D23 | Efimov et al., Novel Oligonucleotide Analogues Derived from Serine and 4-Hydroxyproline, <i>Nucleosides & Nucleotides</i> 18(6&7): 1425-1426 (1999) |
| | D24 | Efimov et al., Polyester and N-Methyl Analogues of Peptide Nucleic Acids: Synthesis and Hybridization Properties, <i>Nucleosides & Nucleotides</i> 18(11&12): 2533-2549 (1999) |
| | D25 | Efimov and Chakhmakhcheva, Solid Phase Synthesis of PNA-Like Oligonucleotide Mimics and their Use for Polyacrylamide-Based Molecular Diagnostic Assays, Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, 10 pgs. |
| | D26 | Egholm et al., Peptide Nucleic Acids Oligonucleotide Analogues with an Achiral Backbone, <i>J. Am. Chem. Soc.</i> 114: 1895-1897 (1992) |
| | D27 | Egholm et al., Recognition of Guanine and Adenine in DNA by Cytosine and Thymine Containing Peptide Nucleic Acids (PNA), <i>J. Am. Chem. Soc.</i> 114: 9677-9678 (1992) |
| | D28 | Egholm et al., PNA Hybridizes to Complementary Oligonucleotides Obeying the Watson-Crick Hydrogen-Bonding Rules, <i>Nature</i> 365: 566-568 (1993) |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|-------------------|-----|--|
| | D29 | Falkiewicz et al., Synthesis and Characterization of New PNA Monomers, Nucleic Acids Symposium Series 42: 29-30 (1999) |
| | D30 | Fahrlander and Klausner, Amplifying DNA Probe Signals: A 'Christmas Tree' Approach, Biotechnology 6: 1165-1168 (1988) |
| | D31 | Finn et al., Nucl. Acids Res. 24:3357-3364 (1996) |
| | D32 | Froehler et al., J. Am. Chem. Soc. 107:278-279 (1985) |
| | D33 | Gait et al., Nucl. Acids Res. 8:1081-1096 (1980) |
| | D34 | Gait et al. Nucl. Acids Res. 10:6243-6254 (1982) |
| | D35 | Gao et al., Tetrahedron Lett. 32:5477-5480 (1991) |
| | D36 | Goodchild, J. Bioconjugate Chem. 1:165 (1990) |
| | D37 | Hanvey et al., Antisense and Antigene Properties of PNAs, Science 258: 1481-1485 (1992) |
| | D38 | Harlowe and Lane, <u>Antibodies, a Laboratory Manual</u> , Cold Spring Harbor Press (1988) |
| | D39 | Heinklein et al., in Girault and Andreu (eds.) <u>The Peptides</u> , 21 st European Peptide Symposium, ESCOM, Leiden pp. 67-77 |
| | D40 | Igloi, Automated Detection of Point Mutations by Electrophoresis in PNA-containing Gels, BioTechniques 27: 798-808 (1999) |
| | D41 | Ishihara and Corey, Strand Invasion by DNA-Peptide Conjugates and Peptide Nucleic Acids, Nucleic Acids Symposium Series 42: 141-142 (1999) |
| | D42 | Izvolsky et al., Sequence-Specific Protection of Duplex DNA against Restriction and Methylation Enzymes by Pseudocomplementary PNAs, Biochemistry 39: 10908-10913 (2000) |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|-------------------|-----|--|
| | D43 | Kenney et al., Mutation Typing Using Electrophoresis and Gel-Immobilized Acrydite Probes, <i>Biotechniques</i> 25: 516-521 (1998) |
| | D44 | Knudsen and Nielsen, Antisense Properties of Duplex- and Triplex-Forming PNAs, <i>Nucl. Acids Res.</i> 24(3): 494-500 (1996) |
| | D45 | Koster et al., <i>Tetrahedron Lett.</i> 24:747-750 (1983) |
| | D46 | Koysynkina et al., <i>Tetrahedron Lett.</i> 35:5173-5176 (1994) |
| | D47 | Kuwahara et al., Synthesis of Oxy-Peptide Nucleic Acids with Mixed Sequences, <i>Nucleic Acids Symposium Series</i> 42: 31-32 (1999) |
| | D48 | Lohse et al., Double Duplex Invasion by Peptide Nucleic Acid: A General Principle for Sequence-Specific Targeting of Double-Stranded DNA, <i>Proc. Natl. Acad. Sci.</i> 96(21): 11804-11808 (1999) |
| | D49 | Mayfield and Corey, Automated Synthesis of Peptide Nucleic Acids and Peptide Nucleic Acid-Peptide Conjugates, <i>Analytical Biochemistry</i> 268: 401-404 (1999) |
| | D50 | McCollum and Andrus, <i>Tetrahedron Lett.</i> 32:4069-4072 (1991) |
| | D51 | Mollegaard et al., PNA/DNA Strand Displacement Loops as Artificial Transcription Promoters, <i>Proc. Natl. Acad. Sci.</i> 91: 3892-3895 (1994) |
| | D52 | Nielsen et al., Sequence-Selective Recognition of DNA by Strand Displacement with a Thymine-Substituted Polyamide, <i>Science</i> 254: 1497-1500 (1991) |
| | D53 | Nielsen, Applications of Peptide Nucleic Acids, <i>Current Opinion in Biotechnology</i> 10:71-75 (1999) |
| | D54 | Nielsen, Antisense Properties of Peptide Nucleic Acid, <i>Methods in Enzymology</i> 313: 156-164 (1999) |
| | D55 | Orum et al., <i>Nucl. Acids Res.</i> 21:5332-5336 (1993) |
| | D56 | Orum et al., Sequence-Specific Purification of Nucleic Acids by PNA-Controlled Hybrid Selection, <i>Biotechniques</i> 19(3): 472-480 (1995) |
| | D57 | Pain et al., <i>Cells Tissues Organs</i> 165:212-219 (1999) |
| | D58 | Proudnikov et al., Immobilization of DNA in PolyAcrylamide Gel for the Manufacture of DNA and DNA-Oligonucleotide Microchips, <i>Analytical Biochemistry</i> 259: 34-41 (1998) |

| | | |
|--------------------|--|-----------------|
| Examiner Signature | | Date Considered |
|--------------------|--|-----------------|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | CITATION |
|-------------------|---|
| | D59 Rehman et al., Immobilization of Acrylamide-modified Oligonucleotides by Co-Polymerization, <i>Nucl. Acids Res.</i> 27(2): 649-655 (1999) |
| | D60 Sambrook et al., Molecular Cloning: A Laboratory Manual, 2 nd edition, Cold Spring Harbor Press, Cold Spring Harbor, N.Y. (1989) |
| | D61 Sandler and Karo, <i>Polymer Synthesis</i> Vol. 1, Academic Press (1992) |
| | D62 Sandler and Karo, <i>Polymer Synthesis</i> Vol. 2, Academic Press (1994) |
| | D63 Sproat et al., <i>Nucl. Acids Res.</i> 14:1811-1824 (1986) |
| | D64 Sugimoto et al., Comparison of Thermodynamic Stabilities between PNA/DNA Hybrid Duplexes and DNA/DNA Duplexes, <i>Nucleic Acids Symposium Series</i> 42: 93-94 (1999) |
| | D65 Sugimoto et al., Positional Effect of Single Bulge Nucleotide on PNA/DNA Hybrid Stability, <i>Nucleic Acids Symposium Series</i> 42: 95-96 (1999) |
| | D66 Takeuchi et al., <i>Chem. Pharm. Bull.</i> 22:832-840 (1974) |
| | D67 van der Laan et al., An Approach Towards the Synthesis of Oligomers Containing a N-2-Hydroxyethyl-aminomethylphosphonate Backbone: A Novel PNA Analogue, <i>Tetrahedron Lett.</i> 37:7857-7860 (1996) |
| | D68 von Wintzingerode et al., PNA-Mediated PCR Clamping as a Useful Supplement in the Determination of Microbial Diversity, <i>Applied and Env. Microbiology</i> 66(2): 549-557 (2000) |
| | D69 Wang et al., PNA Binding-Mediated Induction of Human γ -globin Gene Expression, <i>Nucl. Acids. Res.</i> 27(13): 2806-2813 (1999) |
| | D70 Will et al., The Synthesis of Polyamide Nucleic Acids using a Novel Monomethoxytrityl Protecting-Group Strategy, <i>Tetrahedron Lett.</i> 51:12069-12082 (1995) |
| | D71 Zhong et al., Detection of Apolipoprotein B mRNA Editing by PNA mediated PCR Clamping, <i>Biochem. and Biophys. Res. Comm.</i> 259: 311-313 (1999) |
| | D72 Advertisement for 'mVader', <i>Biotechniques</i> 28 (4): (2000) |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

**INFORMATION DISCLOSURE
STATEMENT
BY APPLICANT**

(Use several sheets if necessary)

Docket Number: AM-00102.P.1.1-US Patent Number: 10/072,975

Applicant:
Efimov et al.

Filing Date: February 9, 2002 Group Art Unit: 1651

U.S. PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB-CLASS | FILING DATE IF APPROPRIATE |
|------------------|--|-----------------|---------|-----------------------|-------|-----------|----------------------------|
| P1 | | 5,760,201 | 6/2/98 | Glazer et al. | | | |
| P2 | | 5,783,687 | 7/21/98 | Glazer et al. | | | |
| P3 | | 6,054,272 | 4/25/00 | Glazer et al. | | | |
| P4 | | 6,180,767 | 1/30/01 | Wickstrom et al. | | | |
| P5 | | 6,232,066 | 5/15/01 | Felder et al. | | | |
| P6 | | 6,280,946 | 8/28/01 | Hyldig-Nielsen et al. | | | |
| P7 | | 6,312,956 | 11/6/01 | Lane | | | |
| P8 | | 6,326,479 | 12/4/01 | Gildea et al. | | | |

FOREIGN PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB-CLASS | Translation | |
|------------------|--|-----------------|----------|---------|-------|-----------|-------------|----|
| | | | | | | | YES | NO |
| F1 | | WO 99/60156 | 11/25/99 | | | | | |
| F2 | | WO 00/34521 | 6/15/00 | | | | | |
| F3 | | WO 01/01144 | 1/4/01 | | | | | |
| F4 | | WO 01/38565 | 5/31/01 | | | | | |
| F5 | | WO 01/68673 | 9/20/01 | | | | | |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|-------------------|-----|--|
| | D1 | Bergmann <i>et al.</i> , Solid Phase Synthesis of Directly Linked PNA-DNA-Hybrids, <i>Tetrahedron Letters</i> 36: 6823-6826 (1995). |
| | D2 | De Backer <i>et al.</i> , An antisense-based functional genomics approach for identification of genes critical for growth of <i>Candida albicans</i> , <i>Nat. Biotechnol.</i> 19: 235-41 (2001). |
| | D3 | Efimov <i>et al.</i> , PNA-Related Oligonucleotide Mimics and their Evaluation for Nucleic Acid Hybridization Studies and Analysis, <i>Nucleosides, Nucleotides & Nucleic Acids</i> 20(4-7), 419-428 (2001). |
| | D4 | Eriksson <i>et al.</i> , Cell Permeabilization and Uptake of Antisense Peptide-Peptide Nucleic Acid (PNA) into <i>Escherichia coli</i> , <i>J. Biol. Chem.</i> 277: 7144-7147 (2002). |
| | D5 | Good <i>et al.</i> , Antisense inhibition of gene expression in bacteria by PNA targeted to mRNA, <i>Nat. Biotechnol.</i> 16: 355-358 (1998). |
| | D6 | Good <i>et al.</i> , Antisense PNA effects in <i>Escherichia coli</i> are limited by the outer-membranes LPS layer, <i>Microbiology</i> 146: 2665-2670 (2000). |
| | D7 | Nasevicius <i>et al.</i> , Effective targeted gene 'knockdown' in zebrafish, <i>Nat. Genet.</i> 26: 216-220 (2000). |
| | D8 | Phelan <i>et al.</i> , Messenger RNA Isolation Using Novel PNA Analogues, <i>Nucleosides, Nucleotides & Nucleic Acids</i> 20(4-7): 1107-1111 (2001). |
| | D9 | Rye <i>et al.</i> , stable fluorescent complexes of double-stranded DNA with bis-intercalating asymmetric cyanine dyes: properties and applications, <i>Nucl. Acids Res.</i> 20: 2803-2812 (1992). |
| | D10 | Sazani <i>et al.</i> , Detection of tumor mutations in the presence of excess amounts of normal DNA, <i>Nat. Biotechnol.</i> 19: 186-189 (2001). |
| | D11 | Sun <i>et al.</i> , Detection of tumor mutations in the presence of excess amounts of normal DNA, <i>Nat. Biotechnol.</i> 19: 186-189 (2002). |
| | D12 | Tomac <i>et al.</i> , Ionic Effects on the Stability and Conformation of Peptide Nucleic Acid Complexes, <i>J. Am. Chem. Soc.</i> 118: 5544-5552 (1996). |
| | D13 | Weiler <i>et al.</i> , Hybridisation based DNA screening on peptide nucleic acid (PNA) oligomer arrays, <i>Nucl. Acids Res.</i> 25: 2793-2799 (1997). |
| | D14 | Wittung <i>et al.</i> , Interactions of DNA binding ligands with PNA - DNA hybrids, <i>Nucl. Acids Res.</i> 22: 5371-5377 (1994). |
| | D15 | www.activemotif.com/products/mol/ , January 31, 2002. |
| | D16 | advertisements, <i>Science</i> 296: 1780 (June 2002). |

| | | | |
|--------------------|--|-----------------|--|
| Examiner Signature | | Date Considered | |
|--------------------|--|-----------------|--|

**INFORMATION DISCLOSURE
STATEMENT
BY APPLICANT**

(Use several sheets if necessary)

| | |
|-------------------------------------|------------------------------|
| Docket Number: AM-00102.P.1.1-US | Patent Number: 10/072,975 |
| Applicant: Efimov et al. | |
| Filing Date: February 9, 2002 | Group Art Unit: 1651 |

U.S. PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMEN T NUMBER | DATE | NAME | CLA SS | SUB- CLASS | FILING DATE IF APPROPRIATE |
|---------------------|----|---------------------|------|------|-----------|---------------|-------------------------------|
| | P1 | | | | | | |

FOREIGN PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB- CLASS | Translatiön | |
|---------------------|----|--------------------|------|---------|-------|---------------|-------------|----|
| | | | | | | | YES | NO |
| | F1 | | | | | | | |

OTHER DOCUMENTS

(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|----------------------|----|--|
| | D1 | Efimov et al., Russian Journal of Bioorganic Chemistry 24(9) 618-630 (1998) (Translated from Bioorganickeskaya Khimiya 24(9):696-709 (1998)) |
| | D2 | Efimov et al., Bioorganickeskaya Khimiya 24(9):696-709 (1998). |

| | | | |
|-----------------------|--|--------------------|--|
| Examiner Signature | | Date Considered | |
|-----------------------|--|--------------------|--|

JUL 31 2002

COPY ORIGIN

**INFORMATION DISCLOSURE
STATEMENT
BY APPLICANT**

(Use several sheets if necessary)

TECH CENTER 1600

JUL 6 6

RECEIVED

| | |
|-------------------------------------|------------------------------|
| Docket Number: AM-00102.P.1.1-US | Patent Number: 10 072,975 |
|-------------------------------------|------------------------------|

| |
|-----------------------------|
| Applicant: Efimov et al. |
|-----------------------------|

| | |
|----------------------------------|-------------------------|
| Filing Date: February 9, 2002 | Group Art Unit: 1651 |
|----------------------------------|-------------------------|

U.S. PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB-CLASS | FILING DATE IF APPROPRIATE |
|------------------|-----|-----------------|----------|-----------------------|-------|-----------|----------------------------|
| <i>h</i> | P1 | 5,432,272 | 7/11/95 | Brenner | | | |
| | P2 | 5,508,178 | 4/16/96 | Rose et al. | | | |
| | P3 | 5,539,082 | 7/23/96 | Nielsen et al. | | | |
| | P4 | 5,641,625 | 6/24/97 | Ecker et al. | | | |
| | P5 | 5,656,461 | 8/12/97 | Demers | | | |
| | P6 | 5,714,331 | 2/3/98 | Buchardt et al. | | | |
| | P7 | 5,719,262 | 2/17/98 | Buchardt et al. | | | |
| | P8 | 5,736,336 | 4/7/98 | Buchardt et al. | | | |
| | P9 | 5,766,855 | 6/16/98 | Buchardt et al. | | | |
| | P10 | 5,773,571 | 6/30/98 | Nielson et al. | | | |
| | P11 | 5,786,461 | 7/28/98 | Buchardt et al. | | | |
| | P12 | 5,837,459 | 11/17/98 | Berg et al. | | | |
| | P13 | 5,861,250 | 1/19/99 | Stanley et al. | | | |
| | P14 | 5,864,010 | 1/26/99 | Cook et al. | | | |
| | P15 | 5,874,553 | 2/23/99 | Peyman et al. | | | |
| | P16 | 5,888,733 | 3/30/99 | Hyldig-Nielson et al. | | | |
| <i>h</i> | P17 | 5,932,711 | 8/3/99 | Boles et al. | | | |

| | | | |
|--------------------|---------------|-----------------|---------|
| Examiner Signature | <i>Berlin</i> | Date Considered | 10/7/03 |
|--------------------|---------------|-----------------|---------|

RECEIVED

APR 05 2004

TECH CENTER 1600/2900

| U.S. PATENT DOCUMENTS | | | | | | | |
|-----------------------|-----|---------------------|----------|---------------------------------|-------------------|---------------|-------------------------------|
| EXAMINER INITIAL | | DOCUMEN T NUMBER | DATE | NAME | C I A SS | SUB- CLASS | FILING DATE IF APPROPRIATE |
| <i>u</i> | P18 | 5,972,610 | 10 26 99 | Buchardt <i>et al.</i> | / | 5 | |
| | P19 | 5,977,296 | 11 2 99 | Nielson <i>et al.</i> | / | | |
| | P20 | 6,004,750 | 12 21 99 | Frank-Kamenetskii <i>et al.</i> | / | | |
| | P21 | 6,015,887 | 1 18 00 | Teng | / | | |
| | P22 | 6,020,124 | 2 1 00 | Sorenson | / | | |
| | P23 | 6,020,126 | 2 1 00 | Carlsson <i>et al.</i> | / | | |
| | P24 | 6,025,140 | 2 15 00 | Langel <i>et al.</i> | / | | |
| | P25 | 6,025,482 | 2 15 00 | Cook <i>et al.</i> | / | | |
| | P26 | 6,045,995 | 4/4 00 | Cummins <i>et al.</i> | / | | |
| | P27 | 6,060,242 | 5/9/00 | Nielson <i>et al.</i> | / | | |
| | P28 | 6,063,571 | 5/16/00 | Uhlmann <i>et al.</i> | / | | |
| | P29 | 6,107,470 | 8/22/00 | Nielson <i>et al.</i> | / | | |
| | P30 | 6,110,676 | 8/26/00 | Coull <i>et al.</i> | / | | |
| | P31 | 6,110,678 | 8/29/00 | Weisburg <i>et al.</i> | / | | |
| | P32 | 6,150,510 | 11/21/00 | Seela <i>et al.</i> | / | | |
| | P33 | 6,165,720 | 12/26/00 | Felgner <i>et al.</i> | / | | |
| <i>u</i> | P34 | 6,180,770 | 1/30/01 | Boles <i>et al.</i> | / | | |

| | | | |
|-----------------------|---------------|--------------------|----------------|
| Examiner Signature | <i>Gu Lin</i> | Date Considered | <i>10/7/03</i> |
|-----------------------|---------------|--------------------|----------------|

FOREIGN PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB- CLASS | Translation | |
|---------------------|-----|--------------------|----------|---------|-------|---------------|-------------|----|
| | | | | | | | YES | NO |
| | F1 | WO 92 002258 | 2 20 92 | | | | | |
| | F2 | WO 92 20702 | 11 26 92 | | | | | |
| | F3 | WO 93 10820 | 6 10 93 | | | | | |
| | F4 | WO 94 22892 | 10 15 94 | | | | | |
| | F5 | WO 94 24144 | 10 27 94 | | | | | |
| | F6 | WO 99 14266 | 3 25 99 | | | | | |
| | F7 | WO 00 56746 | 9 28 00 | | | | | |
| | F8 | WO 00/56748 | 9/28/00 | | | | | |
| | F9 | WO 00/56916 | 9/28/00 | | | | | |
| | F10 | WO 00/56920 | 9/28/00 | | | | | |

| | | | |
|-----------------------|--------------|--------------------|---------|
| Examiner Signature | <i>Ju Li</i> | Date Considered | 10/7/03 |
|-----------------------|--------------|--------------------|---------|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, etc.)

| EXAMINER INITIALS | CITATION |
|----------------------|---|
| | D1 Adams et al., J. Am. Chem. Soc. 105:661-663 (1983) |
| | D2 Ausubel et al., Current Protocols in Molecular Biology, John Wiley and Sons (1998) |
| | D3 Beauchage and Caruthers, Tetrahedron Lett. 22:1859-1862 (1981) |
| | D4 Briebohl et al., Bioorg. & Med. Chem. Lett. 6:665 (1996) |
| | D5 Buchardt et al., PNAs and their Potential Applications in Biotechnology, Tibtech 11: 384-386 (1993) |
| | D6 Chandler et al., Affinity Capture and Recovery of DNA at Femtomolar Concentrations with PNA Probes, Analytical Biochemistry 283: 241-249 (2000) |
| | D7 Chow et al., Nucl. Acids Res 9:2807-2817 (1981) |
| | D8 Cochet et al., Selective PCR Amplification of Functional Immunoglobulin Light Chain from Hybridoma Containing the Aberrant MOPC 21-Derived V _k by PNA-Mediated PCR Clamping, Biotechniques 26: 818-822 (1999) |
| | D9 Coste et al., Tetrahedron Lett. 31:669-672 (1990) |
| | D10 Crea and Horn, Nucl. Acids Res. 8:2341-2348 (1980) |
| | D11 Domling et al., A Novel Method to Highly Versatile Monomeric PNA Building Blocks by Multi Component Reactions, Bioorganic & Medicinal Chemistry Letters 9: 2871-2874 (1999) |
| | D12 Efimov et al., Nucl. Acids Res 11:8369-8387 (1983) |
| | D13 Efimov et al., Nucl. Acids Res. 13:3651-3666 (1985) |
| | D14 Efimov et al., Application of new catalytic phosphate protecting groups for the highly efficient phosphotriester oligonucleotide synthesis, Nucl. Acids Res. 14:6525-6540 (1986) |
| | D15 Efimov et al., Abstracts of Protein Engineering Symposium, Groningen, May 4-7, 1986, Groningen, The Netherlands, Drenth, ed. p.9 (1986) |
| | D16 Efimov et al., Collect. Czech. Chem. Commun. 61:S262-S264 (1996) |

| | | | |
|-----------------------|-------------|--------------------|---------|
| Examiner Signature | <i>John</i> | Date Considered | 10/2/03 |
|-----------------------|-------------|--------------------|---------|

OTHER DOCUMENTS

(Including Author, Title, Date, Pertinent Pages, Etc.)

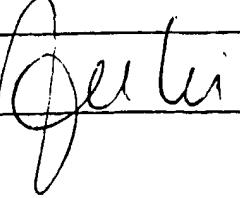
| EXAMINER INITIALS | | CIATION |
|-------------------|-----|---|
| | D17 | Efimov et al., <i>Bioorg. Khim.</i> 24:696-709 (1998) |
| | D18 | Efimov et al., Synthesis and evaluation of some properties of chimeric oligomers containing PNA and phosphono-PNA residues, <i>Nucl. Acids Res.</i> 26:566-575 (1998) |
| | D19 | Efimov et al., Synthesis of polyacrylamides N-substituted with PNA-like oligonucleotide mimics for molecular diagnostic applications, <i>Nucl. Acids Res.</i> 27:4416-4426 (1999) |
| | D20 | Efimov et al., Peptide Nucleic Acids and Their Phosphonate Analogues: II. Synthesis and Physicochemical Properties of Hybrids Containing Serine and 4-Hydroxyproline Residues, <i>Russian Journal of Bioorganic Chemistry</i> 25:545-555 (1999) |
| | D21 | Efimov et al., Polyacrylamide Conjugates with Oligonucleotides and Their Mimics for Diagnostics, <i>Russian Journal of Bioorganic Chemistry</i> 25:752-758 (1999) |
| | D22 | Efimov et al., Phosphonate Analogues of Peptide Nucleic Acids and Related Compounds: Synthesis and Hybridization Properties, <i>Nucleosides & Nucleotides</i> 18:1393-1396 (1999) |
| | D23 | Efimov et al., Novel Oligonucleotide Analogues Derived from Serine and 4-Hydroxyproline, <i>Nucleosides & Nucleotides</i> 18(6&7): 1425-1426 (1999) |
| | D24 | Efimov et al., Polyester and N-Methyl Analogues of Peptide Nucleic Acids: Synthesis and Hybridization Properties, <i>Nucleosides & Nucleotides</i> 18(11&12): 2533-2549 (1999) |
| | D25 | Efimov and Chakhmakhcheva, Solid Phase Synthesis of PNA-Like Oligonucleotide Mimics and their Use for Polyacrylamide-Based Molecular Diagnostic Assays, Shemyakin & Ovchinnikov Institute of Bioorganic Chemistry, 10 pgs. |
| | D26 | Egholm et al., Peptide Nucleic Acids Oligonucleotide Analogues with an Achiral Backbone, <i>J. Am. Chem. Soc.</i> 114: 1895-1897 (1992) |
| | D27 | Egholm et al., Recognition of Guanine and Adenine in DNA by Cytosine and Thymine Containing Peptide Nucleic Acids (PNA), <i>J. Am. Chem. Soc.</i> 114: 9677-9678 (1992) |
| | D28 | Egholm et al., PNA Hybridizes to Complementary Oligonucleotides Obeying the Watson-Crick Hydrogen-Bonding Rules, <i>Nature</i> 365: 566-568 (1993) |

| | | | |
|--------------------|---------------|-----------------|----------|
| Examiner Signature | <i>Bei Lu</i> | Date Considered | 10/27/03 |
|--------------------|---------------|-----------------|----------|

Information Disclosure Statement
Corresponding to 1449A P10

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | CITATION |
|-------------------|---|
| D29 | Falkiewicz et al., Synthesis and Characterization of New PNA Monomers, Nucleic Acids Symposium Series 42: 29-30 (1999) |
| D30 | Fahrlander and Klausner, Amplifying DNA Probe Signals: A 'Christmas Tree' Approach, Biotechnology 6: 1165-1168 (1988) |
| D31 | Finn et al., Nucl. Acids Res. 24:3357-3364 (1996) |
| D32 | Froehler et al., J. Am. Chem. Soc. 107:278-279 (1985) |
| D33 | Gait et al., Nucl. Acids Res. 8:1081-1096 (1980) |
| D34 | Gait et al., Nucl. Acids Res. 10:6243-6254 (1982) |
| D35 | Gao et al., Tetrahedron Lett. 32:5477-5480 (1991) |
| D36 | Goodchild, J. Bioconjugate Chem. 1:165 (1990) |
| D37 | Hanvey et al., Antisense and Antigenic Properties of PNAs, Science 258: 1481-1485 (1992) |
| D38 | Harlowe and Lane, <u>Antibodies, a Laboratory Manual</u> , Cold Spring Harbor Press (1988) |
| D39 | Heinklein et al., in Girault and Andreu (eds.) <u>The Peptides</u> , 21 st European Peptide Symposium, ESCOM, Leiden pp. 67-77 |
| D40 | Igloi, Automated Detection of Point Mutations by Electrophoresis in PNA-containing Gels, BioTechniques 27: 798-808 (1999) |
| D41 | Ishihara and Corey, Strand Invasion by DNA-Peptide Conjugates and Peptide Nucleic Acids, Nucleic Acids Symposium Series 42: 141-142 (1999) |
| D42 | Izquierdo et al., Sequence-Specific Protection of Duplex DNA against Restriction and Methylation Enzymes by Pseudocomplementary PNAs, Biochemistry 39: 10908-10913 (2000) |

| | | | |
|--------------------|---|-----------------|----------|
| Examiner Signature |  | Date Considered | 10/21/03 |
|--------------------|---|-----------------|----------|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | REFERENCE NUMBER | citation |
|-------------------|------------------|--|
| | D43 | Kenney et al., Mutation Typing Using Electrophoresis and Gel-Immobilized Acrydite Probes. <i>Biotechniques</i> 25: 516-521 (1998) |
| | D44 | Knudsen and Nielsen. Antisense Properties of Duplex- and Triplex-Forming PNA. <i>Nucl. Acids Res.</i> 24(3): 494-500 (1996) |
| | D45 | Koster et al., <i>Tetrahedron Lett.</i> 24:747-750 (1983) |
| | D46 | Koysynkina et al., <i>Tetrahedron Lett.</i> 35:5173-5176 (1994) |
| | D47 | Kuwahara et al., Synthesis of Oxy-Peptide Nucleic Acids with Mixed Sequences. <i>Nucleic Acids Symposium Series</i> 42: 31-32 (1999) |
| | D48 | Lohse et al., Double Duplex Invasion by Peptide Nucleic Acid: A General Principle for Sequence-Specific Targeting of Double-Stranded DNA. <i>Proc. Natl. Acad. Sci.</i> 96(21): 11804-11808 (1999) |
| | D49 | Mayfield and Corey, Automated Synthesis of Peptide Nucleic Acids and Peptide Nucleic Acid-Peptide Conjugates, <i>Analytical Biochemistry</i> 268: 401-404 (1999) |
| | D50 | McCollum and Andrus, <i>Tetrahedron Lett.</i> 32:4069-4072 (1991) |
| | D51 | Mollegaard et al., PNA/DNA Strand Displacement Loops as Artificial Transcription Promoters, <i>Proc. Natl. Acad. Sci.</i> 91: 3892-3895 (1994) |
| | D52 | Nielsen et al., Sequence-Selective Recognition of DNA by Strand Displacement with a Thymine-Substituted Polyamide. <i>Science</i> 254: 1497-1500 (1991) |
| | D53 | Nielsen, Applications of Peptide Nucleic Acids. <i>Current Opinion in Biotechnology</i> 10:71-75 (1999) |
| | D54 | Nielsen, Antisense Properties of Peptide Nucleic Acid. <i>Methods in Enzymology</i> 313: 156-164 (1999) |
| | D55 | Orum et al., <i>Nucl. Acids Res.</i> 21:5332-5336 (1993) |
| | D56 | Orum et al., Sequence-Specific Purification of Nucleic Acids by PNA-Controlled Hybrid Selection. <i>Biotechniques</i> 19(3): 472-480 (1995) |
| | D57 | Pain et al., <i>Cells Tissues Organs</i> 165:212-219 (1999) |
| | D58 | Proudnikov et al., Immobilization of DNA in PolyAcrylamide Gel for the Manufacture of DNA and DNA-Oligonucleotide Microchips, <i>Analytical Biochemistry</i> 259: 34-41 (1998) |

Examiner
Signature

Deiter

Date
Considered

10/2/03

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | CITATION |
|-------------------|---|
| D59 | Rehman et al., Immobilization of Acrylamide-modified Oligonucleotides by Co-Polymerization, <i>Nucl. Acids Res.</i> 27(2): 649-655 (1999) |
| D60 | Sambrook et al., Molecular Cloning: A Laboratory Manual, 2 nd edition, Cold Spring Harbor Press, Cold Spring Harbor, N.Y. (1989) |
| D61 | Sandler and Karo, Polymer Synthesis Vol. 1, Academic Press (1992) |
| D62 | Sandler and Karo, Polymer Synthesis Vol. 2, Academic Press (1994) |
| D63 | Sproat et al., <i>Nucl. Acids Res.</i> 14:1811-1824 (1986) |
| D64 | Sugimoto et al., Comparison of Thermodynamic Stabilities between PNA/DNA Hybrid Duplexes and DNA/DNA Duplexes, <i>Nucleic Acids Symposium Series</i> 42: 93-94 (1999) |
| D65 | Sugimoto et al., Positional Effect of Single Bulge Nucleotide on PNA/DNA Hybrid Stability, <i>Nucleic Acids Symposium Series</i> 42: 95-96 (1999) |
| D66 | Takeuchi et al., <i>Chem. Pharm. Bull.</i> 22:832-840 (1974) |
| D67 | van der Laan et al., An Approach Towards the Synthesis of Oligomers Containing a N-2-Hydroxyethyl-aminomethylphosphonate Backbone: A Novel PNA Analogue, <i>Tetrahedron Lett.</i> 37:7857-7860 (1996) |
| D68 | von Wintzingerode et al., PNA-Mediated PCR Clamping as a Useful Supplement in the Determination of Microbial Diversity, <i>Applied and Env. Microbiology</i> 66(2): 549-557 (2000) |
| D69 | Wang et al., PYA Binding-Mediated Induction of Human γ -globin Gene Expression, <i>Nucl. Acids. Res.</i> 27(13): 2806-2813 (1999) |
| D70 | Will et al., The Synthesis of Polyamide Nucleic Acids using a Novel Monomethoxytrityl Protecting-Group Strategy, <i>Tetrahedron Lett.</i> 51:12069-12082 (1995) |
| D71 | Zhong et al., Detection of Apolipoprotein B mRNA Editing by PNA mediated PCR Clamping, <i>Biochem. and Biophys. Res. Comm.</i> 259: 311-313 (1999) |
| D72 | Advertisement for 'mVader', <i>Biotechniques</i> 28 (4): (2000) |

| | | | |
|--------------------|-----------------|-----------------|---------|
| Examiner Signature | <i>Jeff Lin</i> | Date Considered | 10/7/03 |
|--------------------|-----------------|-----------------|---------|

RECEIVED

| | | | | | |
|--|--|--|--|----------------------------------|--|
| INFORMATION DISCLOSURE STATEMENT BY APPLICANT <small>(Use several sheets if necessary)</small> | | JUL 31 2002 Docket Number: AM-00102.P.1.1-US | | Patent Number: 10 072,975 | |
| | | Applicant: Efimov et al. | | Filing Date: February 9, 2002 | |

| U.S. PATENT DOCUMENTS | | | | | | | |
|-----------------------|----|-----------------|---------|-----------------------|-------|-----------|----------------------------|
| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB-CLASS | FILING DATE IF APPROPRIATE |
| <i>Re</i> | P1 | 5,760,201 | 6/29/98 | Glazer et al. | | | |
| | P2 | 5,783,687 | 7/21/98 | Glazer et al. | | | |
| | P3 | 6,054,272 | 4/25/00 | Glazer et al. | | | |
| | P4 | 6,180,767 | 1/30/01 | Wickstrom et al. | | | |
| | P5 | 6,232,066 | 5/15/01 | Felder et al. | | | |
| | P6 | 6,280,946 | 8/28/01 | Hyldig-Nielsen et al. | | | |
| <i>Ma</i> | P7 | 6,312,956 | 11/6/01 | Lane | | | |
| | P8 | 6,326,479 | 12/4/01 | Gildea et al. | | | |

| FOREIGN PATENT DOCUMENTS | | | | | | | |
|--------------------------|--|-----------------|----------|---------|-------|-----------|-------------|
| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB-CLASS | Translation |
| | | | | | | | YES NO |
| <i>F1</i> | | WO 99/60156 | 11/25/99 | | | | |
| <i>F2</i> | | WO 00/34621 | 6/15/00 | | | | |
| <i>F3</i> | | WO 01/01144 | 1/30/01 | | | | |
| <i>F4</i> | | WO 01/38565 | 5/31/01 | | | | |
| <i>F5</i> | | WO 01/68673 | 9/20/01 | | | | |

| | | | |
|--------------------|---------------|-----------------|----------|
| Examiner Signature | <i>Joe Li</i> | Date Considered | 10/17/03 |
|--------------------|---------------|-----------------|----------|

OTHER DOCUMENTS
(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | CITATION |
|-------------------|--|
| D1 | Bergmann <i>et al.</i> , Solid Phase Synthesis of Directly Linked PNA-DNA-Hybrids, <i>Tetrahedron Letters</i> 36: 6823-6826 (1995). |
| D2 | De Backer <i>et al.</i> , An antisense-based functional genomics approach for identification of genes critical for growth of <i>Candida albicans</i> , <i>Nat. Biotechnol.</i> 19: 235-41 (2001). |
| D3 | Efimov <i>et al.</i> , PNA-Related Oligonucleotide Mimics and their Evaluation for Nucleic Acid Hybridization Studies and Analysis, <i>Nucleosides, Nucleotides & Nucleic Acids</i> 20(4-7): 419-428 (2001). |
| D4 | Eriksson <i>et al.</i> , Cell Permeabilization and Uptake of Antisense Peptide-Peptide Nucleic Acid (PNA) into <i>Escherichia coli</i> , <i>J. Biol. Chem.</i> 277: 7144-7147 (2002). |
| D5 | Good <i>et al.</i> , Antisense inhibition of gene expression in bacteria by PNA targeted to mRNA, <i>Nat. Biotechnol.</i> 16: 355-358 (1998). |
| D6 | Good <i>et al.</i> , Antisense PNA effects in <i>Escherichia coli</i> are limited by the outer-membranes LPS layer, <i>Microbiology</i> 146: 2665-2670 (2000). |
| D7 | Nasevicius <i>et al.</i> , Effective targeted gene 'knockdown' in zebrafish, <i>Nat. Genet.</i> 26: 216-220 (2000). |
| D8 | Phelan <i>et al.</i> , Messenger RNA Isolation Using Novel PNA Analogues, <i>Nucleosides, Nucleotides & Nucleic Acids</i> 20(4-7): 1107-1111 (2001). |
| D9 | Rye <i>et al.</i> , stable fluorescent complexes of double-stranded DNA with bis-intercalating asymmetric cyanine dyes: properties and applications, <i>Nucl. Acids Res.</i> 20: 2803-2812 (1992). |
| D10 | Sazani <i>et al.</i> , Detection of tumor mutations in the presence of excess amounts of normal DNA, <i>Nat. Biotechnol.</i> 19: 186-189 (2001). |
| D11 | Sun <i>et al.</i> , Detection of tumor mutations in the presence of excess amounts of normal DNA, <i>Nat. Biotechnol.</i> 19: 186-189 (2002). |
| D12 | Tomac <i>et al.</i> , Ionic Effects on the Stability and Conformation of Peptide Nucleic Acid Complexes, <i>J. Am. Chem. Soc.</i> 118: 5544-5552 (1996). |
| D13 | Weiler <i>et al.</i> , Hybridisation based DNA screening on peptide nucleic acid (PNA) oligomer arrays, <i>Nucl. Acids Res.</i> 25: 2793-2799 (1997). |
| D14 | Wittung <i>et al.</i> , Interactions of DNA binding ligands with PNA - DNA hybrids, <i>Nucl. Acids Res.</i> 22: 5371-5377 (1994). |
| D15 | www.activemotif.com products.mol . January 31, 2002. |
| D16 | advertisements, <i>Science</i> 296: 1780 (June 2002). |

| | | | |
|--------------------|---------------|-----------------|---------|
| Examiner Signature | <i>Cecile</i> | Date Considered | 10/7/03 |
|--------------------|---------------|-----------------|---------|

O I P E
JUL 31 2002

RECEIVED

**INFORMATION DISCLOSURE
STATEMENT
BY APPLICANT**

(Use several sheets if necessary)

Docket Number:
AN-00102.P.1.1-USPatent Number:
10 072,975Applicant:
Efimov et al.Filing Date:
February 9, 2002Group Art Unit:
1651

TECH SECT: P 161-290

Docket Number:
AN-00102.P.1.1-USPatent Number:
10 072,975Applicant:
Efimov et al.Filing Date:
February 9, 2002Group Art Unit:
1651

TECH SECT: P 161-290

U.S. PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMEN T NUMBER | DATE | NAME | CLA SS | SUB- CLASS | FILING DATE IF APPROPRIATE |
|---------------------|----|---------------------|------|------|-----------|---------------|-------------------------------|
| | PI | | | | | | |

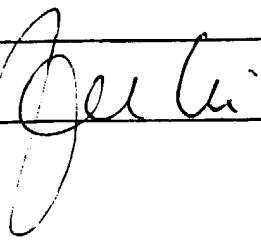
FOREIGN PATENT DOCUMENTS

| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB- CLASS | Translation | |
|---------------------|----|--------------------|------|---------|-------|---------------|-------------|----|
| | | | | | | | YES | NO |
| | FI | | | | | | | |

OTHER DOCUMENTS

(Including Author, Title, Date, Pertinent Pages, Etc.)

| EXAMINER INITIALS | | CITATION |
|----------------------|----|--|
| | D1 | Efimov et al., Russian Journal of Bioorganic Chemistry 24(9) 618-630 (1998) (Translated from Bioorganickeskaya Khimiya 24(9):696-709 (1998)) |
| | D2 | Efimov et al., Bioorganickeskaya Khimiya 24(9):696-709 (1998). |

| | | | |
|-----------------------|---|--------------------|---------|
| Examiner Signature |  | Date Considered | 10/2/03 |
|-----------------------|---|--------------------|---------|